

PATENT

Atty. Dkt. No. APPM/007761/IMPLANT/CONDUCTIVE/JB1

IN THE CLAIMS:

Please cancel claims 2, 13, and 20-26 and amend the claims as follows:

1. (Currently Amended) An ion implantation method for implanting ions comprising:

exciting a predetermined gas in a pressure-reduced chamber to generate plasma containing ions with a predetermined mass number of 20 or lower;

forming a magnetic field along an extraction direction of the ions when the ions are extracted to the outside of the chamber;

extracting the ions from the chamber with a predetermined extraction energy; and

irradiating a silicon substrate with the ions, wherein the silicon substrate has an insulating layer disposed thereon.

2. (Cancelled)

3. (Currently Amended) An ion implantation method ~~according to claim 1, wherein the extraction energy of the ions is for implanting ions comprising:~~

exciting a predetermined gas in a pressure-reduced chamber to generate plasma containing ions with a predetermined mass number;

forming a magnetic field along an extraction direction of the ions when the ions are extracted to the outside of the chamber;

extracting the ions from the chamber with a predetermined extraction energy of 10 keV or lower; and

irradiating a silicon substrate with the ions, wherein the silicon substrate has an insulating layer disposed thereon.

4. (Currently Amended) An ion implantation method according to claim ~~[[1]]~~ 3, wherein the extraction energy of the ions is 1 keV or lower.

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5. (Original) An ion implantation method according to claim 1, wherein the gas is at least one selected from hydrogen gas, helium gas and boron gas.
6. (Original) An ion implantation method according to claim 1, wherein the gas is excited by arc discharge to generate the plasma.
7. (Original) An ion implantation method according to claim 1, wherein the gas is excited by a microwave to generate the plasma.
8. (Original) An ion implantation method according to claim 7, wherein the gas is hydrogen, and the hydrogen gas is excited by a microwave to generate plasma containing hydrogen molecular ions.
9. (Currently Amended) An ion implantation method ~~according to claim 8, for implanting ions comprising:~~
exciting a predetermined gas in a pressure-reduced chamber to generate plasma containing ions with a predetermined mass number, wherein the gas is hydrogen, and the hydrogen gas is excited by a microwave to generate plasma containing hydrogen molecular ions;
forming a magnetic field along an extraction direction of the ions when the ions are extracted to the outside of the chamber;
extracting the ions from the chamber with a predetermined extraction energy;
and
irradiating a silicon substrate with the ions, wherein the silicon substrate has an insulating layer disposed thereon, wherein a frequency of the microwave and intensity of the magnetic field satisfy conditions represented by one selected from the following equations:

$$\omega > \frac{eB}{2\pi m_e} \quad (3)$$

$$\omega < \frac{eB}{2\pi m_e} \quad (4)$$

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where ω denotes a frequency of a microwave, m_e denotes electron mass, e denotes an electron charge, and B denotes intensity of a magnetic field.

10. (Original) An ion implantation method according to claim 8, wherein average stay time from the introduction of the hydrogen gas into the chamber until the extraction of the hydrogen molecular ions to the outside of the chamber is 5×10^{-4} to 5×10^{-3} seconds.

11. (Previously Presented) An ion implantation method according to claim 8, wherein the Si substrate is irradiated with the hydrogen molecular ions from the insulating layer side to implant the hydrogen molecular ions at a predetermined depth of the Si substrate.

12. (Previously Presented) An ion implantation method according to claim 8, wherein the insulating layer comprises a SiO_2 layer and the Si substrate is irradiated with the hydrogen molecular ions from the SiO_2 layer side to implant the hydrogen molecular ions at a predetermined depth of the Si substrate.

13-26. (Cancelled)